

### **REMARKS**

Claims 1-36 are currently pending in the subject application and are presently under consideration. Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein.

#### **I. 3-7-07 Telephonic Interview**

Initially, applicants' representative wishes to gratefully acknowledge the Examiner's consideration of the present application *via* a telephonic interview conducted March 7, 2007. In this regard, Applicants' representative appreciates the Examiner's discussion of the construction of the term "data page" as used in the claims and specification.

Specifically it was posited to applicants' representative that the construction of the term "data page" as used in the specification and claims could be construed as to encompass a piece of paper with writing, or to encompass any structure in memory that contains information. Applicants' representative respectfully submitted that the term "data page" clearly has meaning to one having ordinary skill in the art. That meaning is referred to in the specification, among other places, at Paragraphs [0005] and [0008]. Accordingly, applicants' representative respectfully submits that one having ordinary skill in the art would appreciate that databases typically organize active records in physical memory pages, organize pages into "heap files," and keep track of which pages are in memory at any point in time. Applicants' representative submitted that use of the term "data page" in the claims or in such a specification passage as "concurrent transactions can operate on various copies of a data page, with each transaction modifying its respective copy of the data page" would lead one having ordinary skill in the art to appreciate that, in this context, "data page" refers to a specific structure that is based, at least in part, on a subset of database data as it is copied into physical memory. *See* Paragraph [0008].

As it applies to the outstanding 35 U.S.C. § 101 rejection, applicants' representative contended that when the term "data page" is so construed, the rejection should be properly withdrawn. In order to further clarify the contended construction and arguments submitted, additional comments are submitted below.

Regarding the outstanding 35 U.S.C. § 102(e) rejection of claim 1 based on Miloushev, *et al.*, US 6,889,249, applicants' representative submitted that applicants' invention generally relates to database transactions and "datapages." Specifically, the similar limitation of claims 1, 13, 22, 24, and 31, "obtaining information on an aggregate size change that occurs on a database data page," was referred to for support that applicants' invention is patentable over Miloushev's "aggregation" concept. Applicants' representative respectfully submitted that while the claimed invention relates to concurrent database transactions and "datapages" according to the construction submitted above, Miloushev's "aggregating" concept merely refers to distributed file system attributes and aggregating file stripes or file copies stored on a distributed file system. This distinction, based at least in part on the contended construction of the term "datapage," is highlighted in greater detail below.

## **II. Summary of the Invention**

In accordance with the claimed invention, modifications of a database may be made by multiple users by facilitating operations of concurrent transactions at a subpage level. For instance, such concurrent transactions can operate on various copies of a data page, with each transaction modifying its respective copy of the data page. Accordingly, the present invention facilitates transactions to efficiently keep their respective copies up to date with committed version of that page. In this regard, the framework enables a commit operation to occur with efficiency and simplicity, thus improving multi-user operation and conserving system resources.

## **III. Objection to Claims 21 and 36**

Claims 21 and 36 stand objected to as being of improper dependent form for failing to further limit the subject matter of a previous claim as required by C.F.R § 1.75(c) .

A claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which

permit the computer program's functionality to be realized, and is thus statutory. *See In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994) *at* MPEP § 2106.01 [R-5] (I).

The doctrine of claim differentiation "create[s] a presumption that each claim in a patent has a different scope." *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998). The difference in meaning and scope between claims is presumed to be significant "[t]o the extent that the absence of such difference in meaning and scope would make a claim superfluous." *Tandon Corp. v. United States Int'l Trade Comm'n*, 831 F.2d 1017, 1023 (Fed. Cir. 1987).

Applicants' representative respectfully submits that claims 21 and 36 are in proper dependent form under C.F.R. § 1.75(c) because they further limit the respective the independent claim. Applicants' representative further submits that, by giving the pending claims "their broadest reasonable interpretation consistent with the specification" and applying the "doctrine of claim differentiation," the claims satisfy the requirements of C.F.R. § 1.75(c). Reconsideration and withdrawal of the objection to claims 21 and 36 under C.F.R. § 1.75(c) is respectfully requested.

#### **IV. Rejection of Claims 1-36 Under 35 U.S.C. § 101**

Claims 1-36 stand rejected under 35 U.S.C. § 101 for alleged lack of utility. Claims 1, 10, 13, 22, 24, 29, and 31 are the independent claims. Reconsideration and withdrawal of the rejection of claims 1-36 under 35 U.S.C. § 101 is respectfully requested in view of the comments below.

Because the claimed process applies the Boolean principle [abstract idea] *to produce a useful, concrete, tangible result* ... on its face the claimed process comfortably falls within the scope of §101. *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358. (Fed. Cir. 1999) (Emphasis added); *See State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373, 47 USPQ2d 1596, 1601 (Fed.Cir.1998). The inquiry into patentability requires an examination of the contested claims to see if the claimed subject matter, as a whole, is a disembodied mathematical

concept representing nothing more than a "law of nature" or an "abstract idea," or if the mathematical concept has been *reduced to some practical application rendering it "useful."* *AT&T* at 1357 citing *In re Alappat*, 33 F.3d 1526, 31 1544, 31 U.S.P.Q.2D (BNA) 1545, 1557 (Fed. Cir. 1994) (emphasis added).

The Examiner incorrectly contends that the claimed subject matter lacks a practical application of judicial exception. Applicants' representative disagrees and submits that the Examiner is misconstruing the requirements necessary to fulfill the conditions for patentability under 35 U.S.C. §101. According to *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352 (Fed. Cir. 1999), the standard set forth by the Federal Circuit for determining whether claims are directed towards statutory subject matter is whether the claims as a whole can be applied in a practical application to ***produce a useful, concrete and tangible result***. It is the result of the claims as applied in a practical application that is germane to the determination of whether the claims are directed towards statutory subject matter, not whether the underlying claims recite why the applicant believes the claimed subject matter to be useful. The subject claims clearly satisfies this legal standard.

In particular, independent claim 1 (as well as the other independent claims that recite similar features) recites a database engine that comprises a page aggregator component that operates across concurrent transactions to obtain information on an aggregate size change that occurs on a data page; the data page is copied by transaction(s) that requires modification thereof. This claim clearly recites an invention that produces a useful, concrete, and tangible result – namely an aggregator component that operates across concurrent transactions to determine aggregate size change of a data page, and as a result of this determination the data page is copied by transactions that require modification thereof. It is readily apparent that the claims recite statutory subject matter (e.g., an invention that produces a useful, concrete and tangible result). As a result of the claimed invention, concurrent transactions can operate on various copies of a data page, with each transaction modifying its respective copy of the data page. Accordingly, the claimed invention facilitates active transactions to efficiently keep their respective copies up to date with committed version of that page. In this regard, the framework enables a commit operation to occur with efficiency and simplicity, thus improving

multi-user operation and conserving system resources.

Withdrawal of this rejection is respectfully requested in view of at least the foregoing comments.

**V. Rejection of Claims 1, and 13-36 Under 35 U.S.C. § 102(e)**

Claims 1, and 13-36 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Miloushev, *et al.*, US 6,889,249. Applicants' representative respectfully request withdrawal of this rejection, because Miloushev, *et al.* does not teach or suggest each and every limitation of applicants' claimed invention.

For a prior art reference to anticipate, 35 U.S.C. § 102 requires that “*each and every element* as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950 (Fed. Cir. 1999) (*quoting Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)) (emphasis added).

Applicants' invention relates to systems and methods in support of database page synchronization. With the invention, modifications of a database may be made by multiple users by facilitating operations of concurrent transactions at a subpage level. For instance, such concurrent transactions can operate on various copies of a data page, with each transaction modifying its respective copy of the data page. Accordingly, the claimed invention facilitates active transactions to efficiently keep their respective copy or copies up to date with the committed version of that page. By assuring space availability for a particular page prior to a commit operation, the framework enables a commit operation to occur with efficiency and simplicity, thus improving multi-user operation and conserving system resources.

In one aspect, the claimed invention teaches a page aggregator operating across a plurality of concurrent transactions to retrieve information on an aggregate size change that occurs on the various copies of a particular page. Such aggregate size change information can facilitate determination of space available for various operations to be performed on that page. In a client/server request/response model, this aspect operates on

the transactions from the client/request side during modifications of a database by multiple users by facilitating operations of concurrent transactions at a subpage level.

In contrast, Miloushev, *et al.* merely discloses a file server arrangement, similar to a RAID array, where a file switch mediates requests/responses between clients and file servers to allow massive parallel storage to appear transparently as one large storage drive. *See* col. 5, ll. 7-19. In a client/server request/response model, Miloushev, *et al.* operates on the server/response side, taking many parallel sources of file stripes or mirrored file copies and aggregates them into one response stream deliverable in response to a client request. *Id.* In sum, Miloushev, *et al.* relates generally to the field of storage networks, and more specifically to file switching and switched file systems Miloushev, *et al.* *See* col. 1, ll. 28-30.

In this regard, Miloushev, *et al.* cannot be said to teach or suggest, among other aspects of the claimed invention, determining a size change on a database data page and determining a space availability for the data page over concurrent transactions.

Regarding claims 1, 13, 22, 24, and 31, the claims relate to determining a size change on a database data page. In particular, independent claims 1, 13, 22, 24, and 31 recite a similar limitation: ***obtaining information on an aggregate size change that occurs on a database data page.*** Column 17, lines 21 – 24 and Column 28, lines 61 – 67 are referred to in the Official Action for support that Miloushev, *et al.* discloses obtaining information on an aggregate size change that occur on a database data page. As it relates to storage networks and switched file systems, Miloushev, *et al.* Column 17 lines 21 – 24 merely discloses the idea of using a metadata file to store the aggregated size of the distributed file by encoding the size in the metadata file's date/time attribute fields. This is referring to the process of storing file attributes for keeping track of how large the "aggregated" distributed file is as stored on the switched file system. Applicants' representative respectfully submits that storing distributed file attributes in a metadata file's date/time attribute fields does not teach or suggest obtaining information on an aggregate size change that occurs on a database data page. Column 28, lines 61 – 67 merely address a storage array's capacity becoming exhausted (drive full) by using a mechanism termed spillover. "To avoid such failures, file aggregation includes spillover. This . . . allows the aggregator [(file switch)] to use a different storage device (i.e., file

server) when one or more of the devices run out of storage space." Applicants' representative respectfully submits that monitoring a file server's storage capacity and providing additional file storage space on a switched file system does not teach or suggest obtaining information on an aggregate size change that occurs on a database data page. Reconsideration and withdrawal of the rejection of claims 1, 13, 22, 24, and 31 (and associated dependent claims 14-21, 23, 25-28, and 32-36) under 35 U.S.C. § 102(e) is respectfully requested in view of the comments above.

Regarding claim 29, the claim recites: *determining a space availability for the data page over the concurrent transactions*. Column 28, lines 61 – 67 are referred to in the Official Action for support that Miloushev, *et al.* discloses determining a space availability for the data page over the concurrent transactions. For the foregoing reasons, applicants' representative respectfully submits that monitoring a file server's storage capacity and providing additional file storage space on a switched file system does not teach or suggest determining a space availability for the database data page over the concurrent transactions. Reconsideration and withdrawal of the rejection of claim 29 (and associated dependent claim 30) under 35 U.S.C. § 102(e) is respectfully requested in view of the comments above.

**VI. Rejection of Claims 2-12 Under 35 U.S.C. § 103(a)**

Claims 2-12 stand rejected under 35 U.S.C. § 103(a) over Miloushev, *et al.*, US 6,889,249, in view of Avner, *et al.*, US 6,643,753. Reconsideration and withdrawal of the rejection is respectfully requested, at least because Miloushev, *et al.* alone, or in combination with Avner, *et al.*, does not teach or suggest each and every limitation of applicants' claimed invention.

To reject claims in an application under § 103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation

of success. *Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.* See MPEP § 706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Without conceding the propriety of the combination of Miloushev, *et al.* with Avner, *et al.*, the root reference Miloushev, *et al.*, is deficient with respect to claim 1 at least because Miloushev, *et al.* does not teach or suggest ***obtaining information on an aggregate size change that occurs on a database data page*** as recited in claim 1 and as identified above. For at least the reason that claims 2 – 9 depend directly or indirectly from claim 1, reconsideration and withdrawal of the rejection of dependent claims 2 – 9 under 35 U.S.C. § 103(a) is respectfully requested.

Regarding claims 10-12, the Examiner concedes that Miloushev, *et al.* does not disclose heap allocation but contends that Avner, *et al.* provides such teaching at column 11, lines 1 – 6 and column 9, lines 12 – 17. See Office Action dated January 18, 2007, pgs. 12 – 13. Applicants' representative respectfully disagrees with such contention.

Miloushev, *et al.* does not teach or suggest a heap manager that ***tracks a space availability for the data page via information supplied by the page aggregator*** as recited in claim 10. Referring to FIG. 1, the database engine 100 may also incorporate a heap manager 120. Paragraph [0026]. Space consumed on a page, as well as the space available on a page can be determined and supplied to heap manager 120. *Id.* The heap manager 120 can then track availability of space on the page, and determine whether sufficient space is available to perform some part of or all of a transaction. *Id.* Applicants' representative respectfully submits that one having ordinary skill in the art would appreciate that databases typically organize active records in physical memory pages, organize pages into "heap files," and keep track of which pages are in memory at any point in time. The database memory management is primarily concerned with database data integrity and speed, among other things. Paragraph [0005].

Whereas applicants' "heap manager" is directed to facilitating operations of



concurrent transactions in support of database page synchronization, Avner, *et al.* merely discloses a "heap manager" directed to a virtual memory management scheme. Avner, *et al.* col. 9, ll. 6 – 9. Virtual memory is a way of simulating more memory than actually exists in system memory. *See* col. 8, ll. 1 – 6. When physical memory is full, the virtual memory manager transfers or "pages" some of the memory contents to disk. *See* col. 1, ll. 39 – 41. When a virtual memory address that has been paged to disk is accessed, the virtual memory manager loads the corresponding information from the disk back into the physical memory. *Id.* The heap manager allocates large portions or "heaps" of contiguous virtual memory addresses that are to be used by threads during execution. *See* col. 9, ll. 6 – 10. The virtual memory manager's major concern aside from running out of address space is fragmentation of the virtual memory space. *See* col. 9, ll. 27 – 30. Thus, while the Avner, *et al.* heap manager may operate to manage virtual memory address space, Avner, *et al.* cannot be said to ***track a space availability for the data page via information supplied by the page aggregator***. Reconsideration and withdrawal of the rejection of claim 10 (and associated dependent claims 11-12 ) under 35 U.S.C. § 103(a) is respectfully requested in view of the comments above.

**CONCLUSION**

Applicants' representative believe that the present reply is responsive to each of the points raised by the examiner in the Office Action, and respectfully submits that claims 1-36 of the application are in condition for allowance. Favorable consideration and passage to issue of the application at the Examiner's earliest is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063[MSFTP620US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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